WHAT IS CLAIMED IS:

1. An apparatus for forming a three-dimensional solid structures from a medium, the apparatus comprising:

a projector for projecting an electromagnetic energy in the form of at least one hologram into the medium, the electromagnetic energy in the form of the at least one hologram imparting energy to the medium, the medium changing through at least one phase to form a solid three-dimensional structure.

2. The apparatus of Claim 1 wherein the projector comprises a spatial light modulator.

3. The apparatus of Claim 1 wherein the medium is a gaseous organometallic compound.

4. The apparatus of Claim 1 wherein the projector projects a plurality of holograms.

5. The apparatus of Claim 4 wherein the holograms are projected through a series of mediums.

6. The apparatus of Claim 1, the apparatus further comprising:

a second projector, the second projector projecting a second electromagnetic energy into the medium.

7. An apparatus for forming a three-dimensional solid structure from a medium, the apparatus comprising:

a projector for projecting an electromagnetic energy in the form of the hologram; and

a vessel containing the medium, the vessel having a window, the window being transparent to the electromagnetic energy in the form of the hologram, the electromagnetic energy in the form of the hologram passing through the window and into the medium, the electromagnetic energy in the form of the hologram imparting energy to the medium, the medium changing through at least one phase to form a solid three-dimensional structure.

8. An apparatus for forming a three-dimensional solid structure from a gaseous medium, the apparatus comprising:

a laser light source for generating a coherent electromagnetic energy;

a collimating means, the coherent electromagnetic energy passing through the collimating means to form a collimated electromagnetic energy;

a spatial light modulator, the collimated electromagnetic energy passing through the spatial light modulator to form at least one hologram of electromagnetic energy, the at least one hologram of electromagnetic energy passing into the gaseous medium;

a vessel operable to hold a gaseous medium;

a window contiguous with a wall of the vessel, the window transparent to the electromagnetic energy in the form of the at least one hologram;

an inlet line connected to the vessel, the inlet line operable to selectively flow the gaseous medium into the vessel;

an outlet line connected to the vessel, the outlet line operable to selectively flow the gaseous medium from the vessel; and

a platform situated in the vessel, the electromagnetic energy in the form of the at least one hologram imparting energy to the gaseous medium, the energy causing the gaseous medium to dissociate and deposit a solid three-dimensional structure on the platform.

9. A method for forming a three-dimensional solid structure, the method comprising:

projecting an electromagnetic energy in the form of at least one hologram into a medium, the electromagnetic energy in the form of the at least one hologram imparting energy to the medium, the medium changing through at least one phase to form a three-dimensional solid structure.